SPECIFICATIONS

Model 4413
Updating Discriminator

INPUT

Signal Inputs: Sixteen inputs via Lemo front-panel connectors, 50 Ω ±5%. Protected to ±5 A for 0.5 μsec clamping at ±5 V. Reflections < 4% for input pulses of 2 nsec rise time; input offset voltage typically ±3 mV.
Threshold: -15 mV to -1.0 V ±5% or ±2.5 mV, whichever is greater (common to all channels); front-panel screwdriver adjustment in local or through 10-bit DAC in remote mode. Stability better than 0.3%/°C to 60°C operating temperature. Threshold monitor point on front panel has 10:1 ratio of monitor voltage to actual voltage ±5%. Hysteresis, typical 3.5 mV.
Test Input: One Lemo connector on rear panel, 50 Ω ±5%, triggers all enabled channels. Requires NIM level signal (< -600 mV). Minimum width, 3 nsec. Maximum rate, 150 MHz.
Sync-Strobe Input: One Lemo front-panel connector, 50 Ω ±5%. Requires complementary NIM level signals. When using this input, the Sync-Strobe pulse leading edge will determine the output timing while the output width will be determined by the overlap of the un-strobed outputs and the Sync-Strobe pulse. Inputs to be retimed must precede the Sync-Strobe pulse by 10 nsec minimum. Also ensure that the discriminator's output width completely overlaps the Sync-Strobe pulse.
Veto-Input: One Lemo front-panel connector, 50 Ω ±5%. Permits simultaneous fast inhibiting of all channels. Requires NIM level signals. Direct coupled. Must precede input signal by approximately 1 nsec and overlap its leading edge in Update mode or overlap complete input signal in Burst Guard mode. Minimum duration, 3 nsec.

OUTPUT

Discriminator Outputs: Two separate outputs per channel. ECL level (-0.8, -1.7 V) into 100 Ω twisted-pair. Duration, approximately 3.5 nsec to 100 nsec in the Updating mode, continuously variable via screwdriver control, common to all channels. Rise times and fall times < 2 nsec. Width stability better than 0.3%/°C maximum.
Output Operation Modes: Updating or Burst Guard operation selectable by rear-panel switch. Retiming mode active when using the Sync-Strobe input.
Current Sum Outputs: Two bridged, rear-panel Lemo connectors; high impedance current source; generates a current proportional to the input multiplicity at the rate of -2 mA ±10% per hit (-50 mV per hit into two 50 Ω loads); 100 MHz maximum rate. The two connectors can be used for daisy chaining within a group of similar units.

GENERAL

Maximum Rate: 150 MHz guaranteed.
Mode Select: Local mode and programmable mode selectable via CAMAC command.
LED Indicators: Two front-panel LEDs indicate that programmable mode and Updating operation have been selected when lit.
Double Pulse Resolution: 5 nsec, typical.
Time Slewing: Less than 500 psec for input amplitudes from 2x to 20x over threshold.
Input-Output Delay: 18 nsec. Delay matching better than ±1 nsec.
Test-Output Delay: 18 nsec.
Sync-Strobe to Output Delay: 9 nsec ±0.5 nsec.
Multiple Pulsing: None; one and only one output pulse is produced for each input pulse regardless of input pulse amplitude and duration.
BG/UPD Switch: A rear-panel switch enables Updating or Burst Guard operation for all channels. A front-panel LED is lit when Updating operation is selected.
Power Requirements: 30 mA at +24 V, 1.3 A at +6 V, 4.1 A at -6 V, 30 mA at -24 V.
Packaging: RF-shielded, CAMAC #1 module.

Model 4415A
Non-Updating Discriminator

INPUT

Signal Inputs: Sixteen inputs via a front-panel 34-pin connector. Single-ended or Differential, DC-coupled (AC-coupled optional). Common mode voltage range ±3 V. Impedance, 110 Ω ±5% differential; 55 Ω ±5% from each pin to ground.
Threshold Monitor: Front-panel, 2-pin connector; high impedance, (5.6 kΩ); has 10:1 ratio of monitor voltage to actual voltage. Range: -0.3 V to -6 V ±10 mV or ±10%, whichever is greater for single-ended pulses and corresponding to threshold of 15 mV to 300 mV for differential inputs. Used as output, indicates the internal threshold control voltage. Used as input, commands the threshold control voltage.
Threshold Range: For single-ended negative pulses: -30 mV to -600 mV; for positive going signal with rise time < 300 μsec, the range is 30 mV to 600 mV; for differential signals, 15 mV to 300 mV. Front-panel screwdriver-adjustable potentiometer or controllable via an external voltage applied to the threshold control connector. The threshold is common to all channels. Hysteresis: 3.6 mV typical.
Test Input: One Lemo front-panel connector, 50 Ω ±5% impedance, triggers all channels simultaneously. Requires NIM level signal (-16 mA into 50 Ω = -0.8 V). Tolerance is ±4 mA according to NIM standard. Minimum width: 10 nsec. Test is enabled only when the REMOTE/LOCAL switch is in REMOTE position.

A front-panel LED indicates that Test Mode is enabled.
Veto Input: One Lemo front-panel connector, 50 Ω ±2% input impedance, inhibits all outputs during input of VETO. NIM level signals (-16 mA into 50 Ω = -0.8 V). Tolerance is ±4 mA according to NIM Standard; direct coupled.

OUTPUT

Signal Output: Two outputs per channel in two front-panel 34-pin connectors; ECL differential level (-0.8, -1.8 V into 100 Ω twisted pair. Duration: < 100 nsec to > 1 µsec (factory set; user modification for other values. See Table 1). Output duration set by a front-panel screwdriver control, common to all channels. Rise times and fall times typical 2.2 nsec. Width stability: < 0.2% per °C.
Remote/Local Switch: Front-panel switch. In Local position, disables mask register and Test Mode.

GENERAL

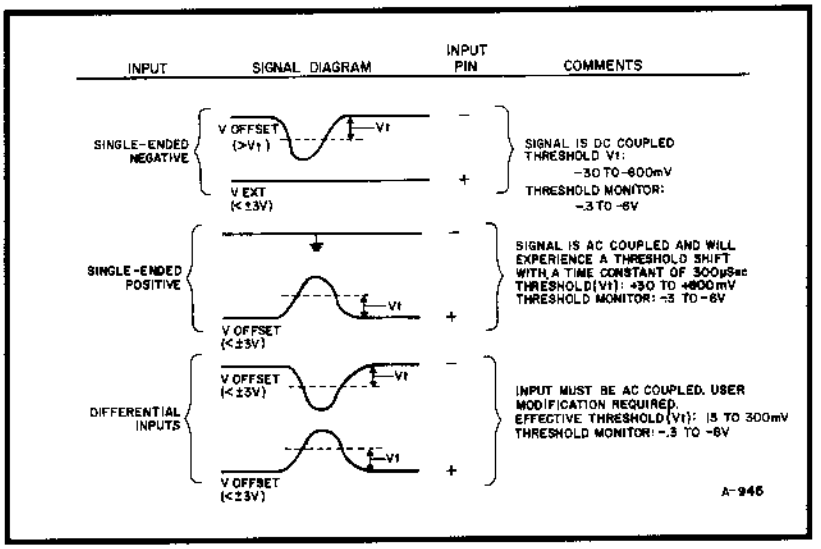
Maximum Repetition Rate: 9 MHz when output width set to 100 nsec. For other settings see Table 1.
Double Pulse Resolution: Typical 110% of output width (between leading edges) or width of pulse plus 12 nsec, whichever is greater.
Time Slewing: < 2 nsec for input amplitudes from 2 to 20 times threshold.

Input Output Delay: Typically 22 nsec.
Test Output Delay: Typically 40 nsec.
Veto Output Delay: Typically 10 nsec.
Multiple Pulsing: None; one and only one output pulse is produced regardless of input pulse amplitude and duration.
Power Requirements: 1.3 A at +6 V, 4.25 at -6 V, 20 mA at -24 V, 33.8 W total.
Packaging: RF-shielded CAMAC #1 module.

User Installed Value for the Timing Capacitor C0 to C15	Output Pulse Width	Maximum Repetition Rate
0 *	~20 nsec to 150 nsec	~30 MHz to 6 MHz
56 pF **	100 nsec to 1 µsec	9 MHz to .9 MHz
680 pF	1 µsec to 10 µsec	900 kHz to 90 kHz
6.8 nF	10 µsec to 100 µsec	90 kHz to 9 kHz
68 nF	100 µsec to 1 msec	9 kHz to .9 kHz

* adjust trim cap parallel to C0 through C15 for proper output pulse width
** factory set

Table 1: Model 4415A User Selectable Output Options



Model 4415A Input Options